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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/004,849

12/07/2001

Masoud Vakili

PAT 302-2

7835

7590

03/29/2004

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EXAMINER

GEISEL, KARA E

ART UNIT

PAPER NUMBER

2877

DATE MAILED: 03/29/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/004,849

Applicant(s)

VAKILI ET AL.

Examiner

Kara E Geisel

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) 13-26 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 27 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>1201, 0203, 0803</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-12 and 27-28, drawn to a tapered optical fiber coupler, classified in class 385, subclass 43.
- II. Claims 13-26, drawn to a method of manufacturing the tapered optical fiber coupler, classified in class 385, subclass 43.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the fiber coupler as claimed can be made by tapering the individual fibers and then bundling and fusing them to form the adiabatically tapered coupler.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

During a telephone conversation with Michael Stallman on March 16th, 2004, a provisional election was made without traverse to prosecute the invention of group I, claims 1-12 and 27-28. Affirmation of this election must be made by applicant in replying to this Office action. Claims 13-26 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of

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inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statements

The information disclosure statements filed on December 1st, 2001, February 21st, 2003, and August 25th, 2003 have been fully considered by the examiner.

Drawings

The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 31a, 31b, and 29b (page 9 ¶s 24-25). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Objections

Claim 28 is objected to because of the following informalities: a typographical error.

In regards to claim 28, line 1, the claim depends on itself instead of a preceding claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary.

Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of

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each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 8-12, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fidric et al. (USPN 6,434,302), as cited by applicant, in view of Stammitz et al. (USPN 4,913,507).

In regards to claims 1 and 3, Fidric discloses a tapered optical fiber bundle (fig. 10) comprising a plurality of input fibers (fig. 10, 44) formed into a fiber bundle, the fiber bundle being tapered (fig. 10) and heavily fused into an induced shape with minimally deformed cores and no interstitial space between the input fibers (fig. 4 and 4A and column 5, lines 15-40). Furthermore, Fidric discloses that the optical fiber bundle has a cleaved end, which is coupled to an output element (fig. 10, 30 and column 5, lines 43-51). Fidric does not disclose that the taper is adiabatic, however this is a well known concept in the art, and it would be obvious for a person skilled in the art to taper Fidric's bundle adiabatically in order to maintain the modes and so that scattering losses are reduced.

For example, Stammitz teaches adiabatically tapering a fiber so that conversion to higher order modes and excessive loss does not occur. This is done in order to efficiently couple two fibers together (column 2, lines 51-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adiabatically taper Fidrics' tapered optical fiber bundle in order to maintain the modes within the fibers and reduce losses due to scattering.

In regards to claim 2, the input fibers are both multimode and single mode (column 5, lines 21-25).

In regards to claim 4, the output element may be another tapered fiber bundle (column 10, lines 5-10).

In regards to claim 5, the output element is a single optical fiber (fig. 5, and column 5, lines 43-51).

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In regards to claim 6, the single optical fiber is a multimode fiber (column 8, lines 35-36).

In regards to claim 8, the single optical fiber is a double clad fiber (column 5, lines 43-51).

In regards to claim 9, the single optical fiber is pre-tapered (columns 9-10, lines 64-67 and 1-14, respectively).

In regards to claim 10, the output element is fusion spliced to the cleaved end (column 5, lines 43-51).

In regards to claim 11, the spliced junction between the tapered fiber bundle and the output element is post tapered (columns 9-10, lines 64-67 and 1-14, respectively).

In regards to claim 12, the optical fiber can be used as an optical combiner, a cladding pumped fiber laser or a cladding pumped optical amplifier (column 1, lines 18-29).

In regards to claim 27, Fidric discloses a star coupler (fig. 13b) comprising a tapered fiber bundle (fig. 13c, 43) formed in the midsection of a plurality of fibers (fig. 13c 30 and column 10 lines 7-10), heavily fused into an induced compact shape with minimally deformed cores and no interstitial space between the fibers (fig. 4 and 4A and column 5, lines 15-40), such that the plurality of fibers form input and output leads on each side of the fused bundle (columns 9-10, lines 64-67 and 1-14, respectively). Fidric does not disclose that the taper is adiabatic, however this is a well known concept in the art, and it would be obvious for a person skilled in the art to taper Fidric's bundle adiabatically in order to maintain the modes and so that scattering losses are reduced.

For example, Stammitz teaches adiabatically tapering a fiber so that conversion to higher order modes and excessive loss does not occur. This is done in order to efficiently couple two fibers together (column 2, lines 51-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adiabatically taper Fidrics' tapered optical fiber bundle in order to maintain the modes within the fibers and reduce losses due to scattering.

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Claims 7 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fidric et al. (USPN 6,434,302), as cited by applicant, in view of Stammnitz et al. (USPN 4,913,507), as applied to claims 1-6, 8-12, and 27 above, and further in view of Weidman (USPN 5,644,037).

In regards to claims 7 and 28, the combined optical fiber device and star coupler are disclosed above. The combined system does not disclose that at least one of the input fibers is terminated to reduce back reflections. However this is well known in the art, and it would be obvious for one of ordinary skill in the art to terminate some of the input fibers so as to reduce back reflections.

For example, Weidman discloses an input fiber bundle for an optical coupler (fig. 11). Some of the input fibers are terminated in order to reduce back reflections in the device and improve coupling efficiency (column 4, lines 52-67). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to terminate some of the fibers in the combined optical fiber device in order to reduce back reflections and improve coupling efficiency.

Additional Prior Art

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The prior art made of record is Murphy et al. (USPN 5,809,189), Bricheno et al. (USPN 6,629,784), and Cai et al. (US Pub 2002/0094168).

Murphy discloses a star coupler comprising a tapered fiber bundle formed in the midsection of a plurality of fibers, adiabatically tapered, and fused into a shape with no interstitial space between the fibers, such that the plurality of fibers form input and output leads on each side of the fused bundle.

Bricheno discloses an optical fiber device comprising a tapered fiber bundle having a plurality of input fibers, adiabatically tapered and fused into a shape with no interstitial space between the input fibers at a cleaved end and an output element that is a single multimode fiber.

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Cai discloses an optical fiber device comprising a tapered fiber bundle having a plurality of input fibers, adiabatically tapered and fused into a shape with no interstitial space between the input fibers at a cleaved end and an output element that is another tapered fiber bundle.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kara E Geisel whose telephone number is **571 272 2416**. The examiner can normally be reached on Monday through Friday, 8am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Frank Font can be reached on **571 272 2415**. The fax phone numbers for the organization where this application or proceeding is assigned are 703 872 9306 for regular communications and 703 872 9306 for After Final communications. For inquiries of a general nature, the Customer Service fax number is 703 872 9317.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703 308 1782.



Frank Font
Art Unit 2877

Frank G. Font
Supervisory Patent Examiner
Technology Center 2800

K.G.
KEG

March 19, 2004